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⑤④ **Apparatus for coiling flexible stretched materials, particularly tubes or cables.**

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⑤⑧ References cited:
CH-A- 618 141
DE-A-1 574 422
DE-A-2 056 895
GB-A- 109 929
GB-A- 980 903
GB-A-1 152 684
GB-A-1 270 819
GB-A-1 328 542
GB-A-1 471 051
US-A-1 827 855
US-A-2 264 992
US-A-2 738 161
US-A-2 780 421

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⑤⑨ References cited:
US-A-2 946 535
US-A-3 105 653
US-A-3 576 196
US-A-4 103 841
US-A-4 202 512

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Description

The invention relates to an apparatus for coiling to packages flexible elongated materials, particularly cables, tubes or pipes, more particularly plastics corrugated tubes, the apparatus comprising a frame carrying at least one driveable reel and a guiding device for the material to be coiled upon a reel, said guiding device having one component which is pivotably arranged and resiliently movable towards the reel core thereby exerting a certain pressure on the material being wound in a radial direction of the reel(s), the other component being movable in an axial direction with respect to said core under the influence of material to be coiled upon the reel core and exerting a certain force upon the material in an axial direction of the reel, the resistance against movement of this component and thereby the force in axial direction being adjustable.

Such an apparatus is disclosed in GB—A—980 903. This prior art apparatus is specially adapted for winding heavy copper wire. One component of the guiding device is a roller lying upon a few windings, the other component is a side face of a radially projecting member of small dimensions. There is no disclosure of any means by which the axial force on the winding to be exerted in the other sense, so that successive layers can be wound.

This prior art apparatus could not be used for other purposes than the specific one envisaged.

The present invention aims at a further development of the apparatus which provides a high stability of the material which is being wound, even at high speeds. More particularly, the invention wants to prevent specific problems which are inherent in winding corrugated tubes in plastics material.

For this purpose there were suitable apparatus in use which could be employed with a low speed extruder for manufacturing said plastics corrugated tubes.

As the speed of extruders has considerably increased, said known apparatus can no longer be used, especially not so in case the materials which have been coiled to packages, have to be removed from the reels.

Problems occurring when coiling a corrugated tube (more particularly a plastics corrugated tube) particularly occur because the material of said corrugated pipe is unable to slide along the material of the corrugated tube part having already been coiled upon the reel. This applies both as regards adjoining the windings near each other and as regards super-imposing a layer of windings upon a layer previously applied upon the reel. Actually a corrugation in the tube may cause adjacent portions of said tube to get hooked into each other.

A particular problem with plastics corrugated tubes is that, to the extent that the production speeds and winding speeds are increased, there is a considerable increase in the inclination of the material to flap, that is to exert an intense vibra-

tion in directions transverse to the longitudinal axis of the material itself, more or less in form of a standing wave between the point where the tube will touch the coil and any preceding fixed guiding point in the system.

In order to obtain a tube package can be handled mechanically, a tight winding is essential and the package has to be rather stable.

From this it follows that during the winding a great stability of the corrugated tube must be aimed at and that the corrugated tube has to be disposed upon the reel in an accurate manner so that a subsequent sliding of the respective plastics material owing to the corrugations is impossible.

The invention aims to provide coiling apparatus which provides as any moment a sufficient support of the tubes to be coiled in order to accurately guide and dispose the windings upon the reel.

This is attained according to the invention with a machine of the kind described in the first paragraph above, which is characterized in that the guiding device is a ledge capable of exerting both the radial and the axial forces on the material being wound, extending tangentially to the reel core and being enclosed between the reel core or material coiled upon it, and a substantially flat plate, also extending tangentially with respect to the core or the material upon it and extending along the entire width of the core, said plate being pivotable around an axis parallel to the axial direction of the core and thereby radially movable away from said core under the action of the material being coiled and the ledge being transversely slideable across said plate parallel to the axial direction of the core.

The advantage of the above is that not only the separate windings will be disposed accurately one beside the other upon the reel, but that the layers of windings are also tightly superimposed, such that a package of stable form is obtained. The ledge is automatically urged sidewardly by the coiled material by the end of a coiled layer in order to dispose a subsequent layer while being guided in a returning movement. From the latter it follows that an additional drive of the guiding member is not required.

The apparatus according to the invention may further comprise — in a manner which is known from CH—A—618141 — a reel core constructed of a plurality of movably supported parts, each having a curved outer face, all outer faces of the movable parts together describing a cylinder when said parts occupy their most outward position, each at one, stationary side face of the reel being pivotably supported and at an opposite side being pivotably connected to means for radially retracting the ends of the movable parts of the core at said opposite side in view of enclosing material in axial direction of the reel and releasing the same, there being provided a plurality of pivotally supported swinging arms having driving means to make them move away from each other into a radial position or move towards each other into a reel removing position, said driving means

being coupled with said means for radially retracting the ends of the core parts. In this way the radial arms can be collapsed in view of removing the coil.

In view of the fact that, according to said CH—A—618 141, the swinging in their collapsed position project over nearly their entire length in front of the regular front of the reel, they may constitute a hindrance in removing and transporting the coil after winding.

The present invention proposes an improvement in this respect. This is obtained in an embodiment of the apparatus which is characterized in that the pivotably supported swinging arms forming in the radial position a side face of the reel, are pivotably connected to a part which is slidable along a central supporting shaft of the reel, each swinging arm at distance from its pivot being slidable through a guiding member to which the displaceable parts of the reel core are pivotably connected, such that the arms can be retracted within the core.

In this way the swingable arms are not only collapsable, but they are retracted within the interior space of the core, at least substantially as far as the greater part of their radial length is concerned as far as such radial length would exceed the axial width of the reel.

The apparatus may further comprise — in a manner which is known in itself from US—A—2 780 421 — a guiding bush or a guiding eye, mounted upon a swinging arm and surrounding the material to be coiled, said device being reciprocating with respect to the reel core.

An embodiment of the apparatus according to the invention is characterized in that a parallel guiding means cooperating with the swinging arm is mounted on the guiding bush in order to maintain the tangentially extending direction of the axis of the guiding bush with respect to the reel.

Whilst, in the just-mentioned prior art apparatus, the swinging arm carrying the guiding bush or guiding eye as a positive drive, in view of realizing level winding, the present invention proposes that the swinging arm carrying the guiding bush is freely swingable in a plane parallel to the reel axis.

The invention will be illustrated with reference to the accompanying drawing, wherein:

— fig. 1 is a front view of apparatus according to the invention for coiling to packages of flexible stretched materials;

— fig. 2 is a diagrammatical side elevation of the apparatus of fig. 1; and

— fig. 3 is a perspective view of the apparatus.

The apparatus as shown in the drawing, consists of a base 1, with a box-shaped frame 2, in which driving devices for two reels 3a and 3b have been mounted. The reels 3a and 3b operate alternatively, that is to say, when material is being coiled upon one reel, the other reel, supporting a package of material having been coiled upon it, is stationary in order to allow the coiled up package to be wrapped by a band or card in order to retain

the windings close and tightly to each other when said package as a whole is removed from the reel. Thereupon said reel is ready to be put into operation again after the package on the other reel has been completed. In order to coil corrugated tubes, more particularly plastics corrugated tubes, to a package, a guiding device has been provided for coiling material upon one of reels 3a, 3b, respectively which guiding device is, according to the invention, a composite guiding device. One component of it is adapted to dispose material in radial direction of the reel, or to release said material, the other component being adapted to enclose said material in axial direction of the reel or to release the material.

The composite guiding device may comprise a pressure member 5 extending tangentially with the reel core 4, being urged with a certain pressure towards said reel core and being movable away from it by material to be coiled upon the core. Said guiding device may, more particularly, be a ledge 5 extending tangentially with respect to the reel core 4. It is movable in axial direction with respect to said core under the influence of a force exerted by the material to be coiled. Such force is exerted upon a side face of ledge 5 being positioned transversely to the core axis. As ledge 5, in the position represented in fig. 3 for reel 3a, directly adjoins the reel core 4 or bears with a component upon windings already coiled upon the reel, arriving material to be disposed upon said reel will exert a lateral force upon ledge 5. Under the influence of this force ledge 5 can be moved so that the windings will be disposed tightly upon the reel one beside the other. When a coiled layer is finished arriving material will "jump" across the ledge 5, thus causing the latter to temporarily deviate, after which the windings will be disposed upon the reel in a reversed axial sense; the material will then exert a force against the other side of ledge 5.

Ledge 5 is confined between reel core 4, or material having been coiled hereupon, and a plate 6 extending tangentially with the coiling core and having a width equal to the entire width of the reel core 4. Plate 6 is pivotably supported at 7, so that it may swing away from core 4 under the influence of the coiled material. Ledge 5 is slidable laterally along said plate 6, the sliding resistance being adjustable. For that purpose ledge 5 has been slidably mounted upon the axle 10 by means of a bush 8 and an adjustable clamp 9. One end of axle 10 comprises a fixed abutment 11, the other end comprising an adjustable abutment 12. Thus, the path of ledge 5 with respect to the length of core 4 of a reel can be accurately adjusted in relation to the position of the last winding at either end of the core. As soon as ledge 5 abuts one of the abutments 11 or 12, the material to be coiled passes across the ledge 5 and exerts a force at the other side of it as soon as the formation of the subsequent layer is started. The apparatus according to the invention thus operates entirely automatically, plate 6 tightly retaining previously applied windings upon the

reel core or upon a previously laid layer of windings.

The pressure of plate 6 and therefore also of ledge 5, is obtained in that a counter weight 13 is provided on plate 6 at the other side of the pivotal support 7. In view of said pivotal support, plate 6 and ledge 5 may also be entirely detached from the reel, for example, by urging said reel downwardly by means of a foot pedal, when a coiled package has to be removed from said reel. Figures 1 and 2 show the lowest position of plate 6 with ledge 5. A ledge 5 and a plate 6 together form a composite guiding device for each of the reels 3a and 3b. The sliding resistance of ledge 5 along axle 10 is adjustable by means of the adjustable clamp 9, in order to adapt said sliding resistance to the resiliency of the material or to the thickness of the material to be coiled.

The idea of the invention is also embodied in the reels 3a and 3b to be applied in the novel apparatus according to the invention.

This is effected in that the component of the composite guiding device for radially disposing or releasing material coiled upon the reel consists of movably supported parts 14 of the reel core 4 and in that the component for enclosing material in axial direction of the reel consists of pivotably supported swinging arms 15. These arms move towards each other in a coiling position (see fig. 3 for reel 3b), or away from each other into a radial position (see fig. 3 for reel 3a). The arms 15, in the former position, make an acute angle with the axis of the reel or extend parallel thereto, and in their extended or radial position constitute a side face of the reel.

Reels 3a and 3b also comprise stationary arms 16 which constitute a stationary side face of the respective reel.

The apparatus according to the invention comprises as side faces or flanges the arms 15 and 16, and no closed discs or wheels, as the former do allow wrapping of portions of a package coiled upon the reel.

The portions 14 of the reel core are pivotably supported at 17 (fig. 2) near a stationary side face of the reel, said parts being pivotably connected to a rod system 18 for radially retracting the swingable arms.

Each part 14 has a curved outer face, all these outer faces together describing a cylinder when said parts occupy their most outward position (see fig. 3 for reel 3a). The swinging arms 15 pivotably supported at 19, are pivotably connected to a part 21, sliding about a central supporting shaft 20 of the reel(s), while each swinging arm 15 is at some distance from its pivot 19 slidably passed through a pivotably disposed guiding member 22. Said guiding member 22 for the swinging arms 15 has a pivot 23 at the swingable end of a part 14.

When a package coiled upon a reel 3a or 3b has to be removed from a reel, after parts of said package have been wrapped by a separate band or cord for retaining the windings, part 21 is, from the position shown in fig. 3 for reel 3a, slid along

shaft 20, to a position denoted with a dotted line in fig. 2. The sliding operation may occur in various ways, e.g. manually or by means of a sliding bar disposed and driven within shaft 20, part of said bar passing through a slot of shaft 20 and cooperating with part 21. The latter need not to be elucidated as the manner of displacement of part 21 does not form part of the scope of the present invention. On displacing part 21 from its, most outward position to a most inward position, the swinging arms 15 will swing outwardly and will come to lie within the core 4, as shown in fig. 3 for reel 3b. At the event of said displacement of the swinging arms 15, the core parts 14 are compressed, providing said core 4 with an almost conical circumferential face, so that the package may be easily removed from said core. A compression of core portions 14 may occur under the influence of the package, but particularly due to the cooperation of swinging arms 15 with members 22 and pivots 19. When part 21 is moved to its outermost position, swinging arms 15 will automatically regain their radial position so that the respective reel is ready to be re-used.

The invention can also be used in an apparatus comprising two continuously operating reels, without interrupting the production or the supply of material. According to the invention reels 3a and 3b can be used alternatively in that in accordance with the invention the composite guiding device is a device 25 surrounding material to be coiled and being mounted upon a swinging arm 24, said device 25 being reciprocating with respect to the reel core 4, and allowing, in a position away from said reel core, a displacement in axial direction of material near the reel.

The supplied material to be coiled, in form of a tube, particularly a corrugated tube, more particularly a plastics corrugated tube, has been represented in fig. 3 with broken lines 26. The device surrounding the material is a guiding bush or a guiding eye which is swingable together with swinging arm 24 in a plane perpendicular to the reel axis. Said swinging has been indicated in fig. 1 and 3 by means of a broken line 27. It serves to install the beginning of a tube to be coiled near the core of a reel, said beginning being fixed upon the reel by means of a device not to be further elucidated. Subsequently, guiding bush 25 is placed in its initial position so that the coiling operation can start. A correct position of bush 25 is ensured by a parallel guide being mounted upon said bush and cooperating with a swinging arm for maintaining the axis of guiding bush 25 to an extend tangentially with respect to the reel. As there are various solutions for the latter, a preferred system may e.g. exist of a gearwheel, mounted on a rotatable axle 28 of the guiding bush 25 inside the swinging arm 24. A chain running past said gearwheel is also swung around a stationary gearwheel of a non-rotatable axle 29 of the swinging arm 24. As a similar parallel guide is generally known, the latter need not be described further on.

As a tube to be coiled upon a reel is moving in

an axial direction with respect to said reel(s), guiding bush 25 and the essential coiling tension upon tube 26 could exert a braking force, so that the direction of the tube windings to be coiled could be changed too early and a reversed axial movement would occur prior to the tube having reached one of the side faces of the reel(s). In order to prevent the latter, the guiding bush 25 with swinging arm 24 is swingable into a position away from the reel in a plane extending parallel to the axis of the reel. Said swinging movement has been denoted by arrow 30 in fig. 3. It can be effected e.g. by supporting shaft 29 in frame 2 on a horizontal transverse shaft and by balancing the entirety so that only a very slight lateral force need be exerted upon bush 25 in order to have it moved in the sense of the arrow 30. The use of the guiding bush 25 on the swinging arm 24 is particularly suitable in the embodiment as illustrated in which the swinging arm 24 is mounted centrally between two spaced reels 3a, 3b respectively, the guiding bush being swingable from a central position (fig. 3) towards both one or the other reel core.

Although the invention has been described with particular reference to plastics corrugated tubes, where indeed its advantages are striking, it can also be applied for coiling other elongated materials, because in any case the advantage will be a perfect control of the coiling process and therefore a perfect shape, structure and stability of the coiled packages obtained.

Claims

1. Apparatus for coiling to packages flexible elongated materials (26) particularly cables, tube or pipes, more particularly plastics corrugated tubes, the apparatus comprising a frame (2) carrying at least one driveable reel (3a, 3b) and a guiding device for the material (26) to be coiled upon a reel, said guiding device having one component (6, 25) which is pivotably arranged and resiliently movable towards the reel core thereby exerting a certain pressure on the material being wound in a radial direction of the reel(s), the other component (5, 25) being movable in an axial direction with respect to said core under the influence of material (26) to be cored upon the reel core (4) and exerting a certain force upon the material in an axial direction of the reel, the resistance against movement of this component and thereby the force in axial direction being adjustable, characterized in that the guiding device is a ledge (5) capable of exerting both the radial and the axial forces on the material (26) being wound, extending tangentially to the reel core (4) and being enclosed between the reel core (4) or material coiled upon it, and a substantially flat plate (6), also extending tangentially with respect to the core (4) or the material upon it and extending along the entire width of the core (4), said plate (6) being pivotable around an axis (7) parallel to the axial direction of the core (4) and thereby radially movable away from said core

under the action of the material being coiled and the ledge (5) being transversely slidable across said plate (6) parallel to the axis direction of the core.

2. Apparatus according to claim 1, characterized in that the profile of the ledge (5) is substantially an inverted T-shape, either side face of the leg thereof as well as each of the cross bar halves being capable of functioning as the one component and the other to act as the guiding element for the material during winding successive layers, in one or the other sense over the width of the reel core.

3. Apparatus according to claim 1, further comprising in known manner a reel core constructed of a plurality of movably supported parts (14), each having a curved outer face, all outer faces of the movable parts (14) together describing a cylinder when said parts (14) occupy their most outward position, each at one, stationary side face of the reel being pivotably supported and at an opposite side being pivotably connected to means for radially retracting the ends of the movable parts (14) of the core (4) at said opposite side, in view of enclosing the material (26) in axial direction of the reel and releasing the same, there being provided a plurality of pivotally supported swinging arms (15) having driving means to make them move away from each other into a radial position or move towards each other into a reel removing position, said driving means being coupled with said means for radially retracting the ends of the core parts, characterized in that the pivotably supported swinging arms (15) forming in the radial position a side face of the reel (4), are pivotably connected to a part (21) which is slidable along a central supporting shaft (20) of the reel, each swinging arm (15) at distance from its pivot (19) being slidable through a guiding member (22) to which the displacement parts (14) of the reel core (4) are pivotably connected, such that the arms (15) can be retracted within the core (4).

4. Apparatus according to any of claims 1—4, further comprising in known manner a guiding bush or a guiding eye (25), mounted upon a swinging arm (24) and surrounding the material (26) to be coiled, said device being reciprocating with respect to the reel core (4), characterized in that a parallel guiding means cooperating with the swinging arm (24) is mounted on the guiding bush (25) in order to maintain the tangentially extending direction of the axis of the guiding bush (25) with respect to the reel.

5. Apparatus according to claim 4, characterized in that the swinging arm (24) carrying the guiding bush (25) is freely swingable (arrow 30) in a plane parallel to the reel axis.

Patentansprüche

1. Vorrichtung zum Aufwickeln von laggestrecktem, biegsamen Gut (26), insbesondere Kabeln, Schläuchen oder Rohren, und dabei vor allem Kunststoffwellrohren, zu Wickeln, wobei die Vor-

richtung einem Rahmen (2) umfaßt, der zumindest eine antreibbare Trommel (3a, 3b) und eine Führungseinrichtung für das auf eine Trommel aufzuwickelnde Gut (26) trägt, und die Führungseinrichtung einen Bestandteil (6, 25) aufweist, der schwenkbar angeordnet sowie elastisch zum Trommelkern hinbewegbar ist und dadurch einen gewissen Druck auf das Gut ausübt, das in einer radialen Richtung auf die Trommel(n) aufgewickelt wird, während der andere Bestandteil (5, 25) unter dem Einfluß von auf den Trommelkern (4) aufzuwickelndem Gut (26) in einer axialen Richtung in bezug auf den Kern bewegbar ist und in einer axialen Richtung der Trommel eine gewisse Kraft auf das Gut ausübt, wobei der Widerstand gegen eine Bewegung dieses Bestandteils und dadurch die Kraft in axialer Richtung einstellbar ist, dadurch gekennzeichnet, daß die Führungseinrichtung eine Leiste (5) aufweist, mittels der sowohl die radialen als auch die axialen Kräfte auf das im Aufwickeln begriffene Gut (26) aufbringbar sind und die sich tangential zum Trommelkern (4) erstreckt sowie zwischen dem Trommelkern (4) oder darauf aufgewickeltem Gut und einer im wesentlichen ebenen Platte (6) eingefaßt ist, die sich ebenfalls tangential zum Kern (4) oder dem darauf befindlichen Gut und über die gesamte Breite des Kerns (4) erstreckt, und daß die Platte (6) um eine zur Axialrichtung des Kerns (4) parallele Achse (7) schwenkbar und dadurch unter der Einwirkung des im Aufwickeln begriffenen Gutes radial vom Kern hinwegbewegbar ist, während die Leiste (5) parallel zur Axialrichtung des Kerns über die Platte (6) querverschieblich ist.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das Profil der Leiste (5) im wesentlichen eine umgekehrte T-Form aufweist, wobei beide Seitenflächen ihres Steges wie auch jeder der Querschenkel als der eine und der andere Bestandteil arbeiten, um als Führungselement für das Gut beim Aufwickeln aufeinanderfolgender Lagen im einen oder anderen Sinne über die Breite des Trommelkerns zu wirken.

3. Vorrichtung nach Anspruch 1, bei der in bekannter Weise ein Trommelkern vorgesehen ist, der von einer Mehrzahl beweglich abgestützter Teile (14) gebildet ist, die jeweils eine gekrümmte Außenfläche aufweisen, wobei sämtliche Außenflächen der beweglichen Teile (14) gemeinsam einen Zylinder beschreiben, wenn die Teile (14) zugleich ihre äußerste Stellung einnehmen, bei der ferner eine ortsfeste Seitenfläche der Trommel schwenkbar abgestützt und an einer gegenüberliegenden Seite schwenkbar mit einer Einrichtung zum radialen Einziehen der Enden der beweglichen Teile (14) des Kerns (4) an der gegenüberliegenden Seite verbunden ist, um das Gut (26) in Axialrichtung der Trommel einzufassen und dieses freizugeben, und bei der schließlich eine Mehrzahl von schwenkbar gelagerten Schwenkarmen (15) mit Antriebsmitteln vorgesehen ist, um sie in eine radiale Stellung auseinander oder in eine Abnahmestellung der

Trommel aufeinanderzu zu bewegen, wobei die Antriebsmittel mit den Einrichtungen zum radialen Einziehen der Enden der Kernteile verbunden sind, dadurch gekennzeichnet, daß die schwenkbar gelagerten Schwenkarme (15), die in der radialen Stellung eine Seitenfläche der Trommel (4) bilden, schwenkbar mit einem Teil (21) verbunden sind, das entlang einer zentralen Stützwelle (20) der Trommel gleitbar ist, und daß jeder Schwenkarm (15) im Abstand von seinem Schwenkpunkt (19) durch ein Führungsglied (22) gleitbar ist, mit dem die verlagerbaren Teile (14) des Trommelkerns (4) derart schwenkbar verbunden sind, daß die Arme (15) innerhalb des Kerns (4) einziehbar sind.

4. Vorrichtung nach einem der Ansprüche 1 bis 4, mit einen in bekannter Weise vorgesehenen Führungsbuchse oder Führungssöse (25), die an einem Schwenkhebel (24) angebracht ist und das aufzuwickelnde Gut (26) umgibt, wobei diese Einrichtung in bezug auf den Trommelkern (4) hin- und herbeweglich ist, dadurch gekennzeichnet, daß eine mit dem Schwenkhebel (24) zusammenwirkende Parallelführungseinrichtung an der Führungsbuchse (25) angebracht ist, um die zur Trommel tangential verlaufende Richtung aufrechtzuerhalten.

5. Vorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß der die Führungsbuchse (25) tragende Schwenkhebel (24) in einer parallel zur Trommelachse verlaufenden Ebene frei schwenkbar ist (Pfeil 30).

Revendications

1. Appareil pour le bobinage en paquets de matériaux flexibles de grande longueur (26), en particulier des câbles, tubes ou tuyaux, et plus particulièrement des tubes ondulés en matière plastique, l'appareil comprenant un bâti (2) qui porte au moins une bobine (3a, 3b) apte à être prise en mouvement et un dispositif de guidage pour le matériau (26) destiné à être enroulé sur une bobine, le dit dispositif de guidage ayant un composant (6, 25) qui est disposé à pivotement et déplaçable élastiquement vers le noyau de la bobine en exerçant ainsi une certaine pression sur le matériau qui s'enroule, dans une direction radiale de la ou des bobine(s), l'autre composant (5, 25) étant déplaçable dans une direction axiale par rapport audit noyau sous la sollicitation du matériau (26) destiné à être bobiné sur le noyau (4) de la bobine et exerçant une certaine force sur le matériau dans une direction axiale de la bobine, la résistance au mouvement de ce composant et par suite la force dans la direction axiale étant réglables, caractérisé par le fait que le dispositif de guidage est une réglette (5) apte à exercer à la fois les forces radiales et axiales sur le matériau (26) en cours d'enroulement, et qui s'étend tangentiellement au noyau (4) de la bobine tout en étant enserrée entre le noyau (4) de la bobine ou le matériau bobiné sur celui-ci, et une plaque (6) sensiblement plane, qui s'étend aussi tangentiellement au noyau (4) ou au matériau se

trouvant sur celui-ci et couvre tout la largeur du noyau (4), la dite plaque (6) étant montée à pivotement autour d'un axe (7) parallèle à la direction axiale du noyau (4) et par suite déplaçable radialement de façon à s'éloigner dudit noyau sous l'action du matériau en cours de bobinage, et la réglette (5) pouvant coulisser transversalement sur la dite plaque (6), parallèlement à la direction axiale du noyau.

2. Appareil selon la revendication 1, caractérisé par le fait que le profil de la réglette (5) a sensiblement la forme d'un T renversé, chaque face latérale de sa jambe ainsi que chacune des moitiés de sa branche transversale étant aptes à jouer le rôle de l'un des composants, tandis que l'autre sert d'élément de guidage pour le matériau pendant l'enroulement des couches successives, dans un sens ou dans l'autre sur la largeur du noyau de la bobine.

3. Appareil selon la revendication 1, comprenant en outre, d'une manière connue, un noyau de bobine composé de plusieurs pièces (14) montées mobiles, dont chacune comporte une face extérieure incurvée, toutes les faces extérieures des pièces (14) décrivant conjointement un cylindre lorsque lesdites pièces (14) occupent leur position la plus extérieure, chacune étant supportée à pivotement sur une face latérale immobile de la bobine et étant connectée à pivotement, sur une face opposée, à un moyen pour rétracter radialement les extrémités des pièces mobiles (14) du noyau (4) sur ladite face opposée en vue d'enserrer le matériau (26) dans la direction axiale de la bobine et de libérer celui-ci, plusieurs bras oscillants (15), supportés à pivotement, étant prévus et pourvus de moyens

de commande permettant de les éloigner l'un de l'autre pour les placer dans une position radiale ou de les rapprocher l'un de l'autre dans une position de retrait de la bobine, lesdits moyens de commande étant couplés audit moyen pour rétracter radialement les extrémités des pièces du noyau, caractérisé par le fait que les bras oscillants (15), supportés à pivotement, qui dans la position radiale, forment une face latérale de la bobine (4), sont connectés à pivotement à une pièce (21) qui est montée coulissante le long d'un arbre de support central (20) de la bobine, chaque bras oscillant (15) pouvant coulisser, à distance de son pivot (19), dans un élément de guidage (22) auquel les pièces déplaçables (14) du noyau (4) de la bobine sont connectées à pivotement, pour que les bras (15) puissent être rétractés dans le noyau (4).

4. Appareil selon l'une quelconque des revendications 1—4, comprenant en outre, d'une manière connue, un manchon de guidage ou un oeilleton de guidage (25) monté sur un bras oscillant (24) et entourant le matériau (26) destiné à être bobiné, ledit dispositif pouvant subir un mouvement de va-et-vient par rapport au noyau (4) de la bobine, caractérisé par le fait qu'un moyen de guidage parallèle coopérant avec le bras oscillant (24) est monté sur le manchon de guidage (25) afin de maintenir la direction d'orientation tangentielle de l'axe du manchon de guidage (25) par rapport à la bobine.

5. Appareil selon la revendication 4, caractérisé par le fait que le bras oscillant (24) portant le manchon de guidage (25) est apte à osciller librement (flèche 30) dans un plan parallèle à l'axe de la bobine.

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